

The Positive Impact of Behavioral Change on Food Safety & Productivity



Executive Summary

This study was designed and conducted by Robert Meyer to evaluate a methodology for sustainably changing the behaviors of front-line workers in the food industry. Mr. Meyer has more than 40 years of experience in the food industry. He has held a number of positions including food facility management and development of sustainable behavioral change and learning transfer models.

Background

Food and workplace safety is a top priority for the food industry and its regulatory agencies. While training methods have improved safety compliance over the past decade, additional efforts and methodologies need to be applied, especially in light of recent product recalls, additional regulatory mandates and consumer concerns about the safety of their food supply. In addition to the focus on safety, companies seek continual improvements in productivity through reduction of waste, spoilage, and other production efficiencies in order to maintain a profitable business in light of a challenging economy.

The purpose of this study was to determine if prescribed supervisory coaching coupled with effective training could drive employee performance among front-line food workers. The study was conducted at four U.S. food processing facilities and had three phases:

- ▶ **Phase 1:** Identify the production process to improve and then determine what standard should be used to measure effective performance.
- ▶ **Phase 2:** The identified standard was parsed into a sequence of process steps. Break down each step into a sequence of effective behaviors.
- ▶ **Phase 3:** Supervisors conduct corrective observations using detailed compliance checklists. In cases of non-compliance, corrective actions are assigned.

Across the four separate facilities, the study measured compliance levels at pre-training baseline, post-training, and following each corrective observation (Exhibit 1). The average pre-training compliance rate was 68 percent. Post-training, compliance improved to 82 percent and after three corrective observations, compliance increased to 94 percent.

The results indicate that the combination of effective training, corrective observations, and coaching can improve safety and productivity performance by up to 26 percentage points.

Change in Food Handler Performance

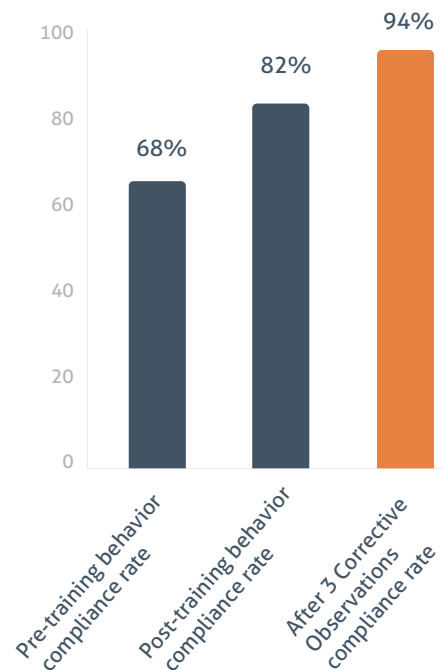


Exhibit 1

Despite the increased emphasis on food safety, there has been no appreciable decline in the number of food product recalls by the U.S. FDA. The agency's website displaying "Recalls, Market Withdrawals & Safety Alerts" in 2013 list more than 160 food product recalls stemming from contamination issues such as salmonella, pathogens, listeria monocytogenes, novovirus, e.coli, and metal fragments.¹

The U.S. Centers for Disease Control and Prevention (CDC) estimate that each year, 1 in 6 Americans (or 48 million people) become ill from foodborne illnesses, "128,000 people are hospitalized and 3,000 die."² The growing response to the public threat from food safety lapses resulted in government legislation (e.g., Food Safety Modernization Act - FSMA) and stepped up enforcement and fines. Food safety is also recognized as a global problem because "foodborne and waterborne diseases

kill an estimated 2.2 million people annually, 1.9 million of them children... and food containing harmful levels of chemicals can cause serious health problems, including cancer," according to the World Health Organization in 2013.³

Safety, despite its overwhelming importance, is not the only concern for the industry. Food companies from farm to fork are seeking ways to improve productivity and reduce waste in order to improve their company's financial performance. A report published in 2007 for the Texas Workforce Commission by the Food Training Institute indicates that even a small improvement in worker productivity through training can have a significant impact on profitability.⁴

The study is based on the premise that a closed loop of effective training – combined with supervisory observations and coaching can significantly improve performance (Exhibit 2).

The model consists of the following key steps:

- ▶ Deconstructing a particular process into a sequence of processes/steps.
- ▶ Determining the desired employee action/behavior at each step and identifying deficiencies.
- ▶ Observing, measuring, and documenting the baseline level of behavior compliance.
- ▶ Training front-line employees on acceptable behaviors.

Enabling supervisors to make corrective observations of individual employees. Corrective actions are non-judgmental and non-punitive in order to focus on improvement (Exhibit 3).

Repeating the process on a sustained basis to validate employee improvement.

Sustainable Behavioral Change



Exhibit 2

Corrective Observation Process



Exhibit 3

During the corrective observation, supervisors documented specific behaviors on detailed behavioral observation sheets and checklists.

After a corrective observation, the supervisor scored the employee’s performance using an evaluation scale (Exhibit 4) and informed the employee of the score. The level of performance determined the supervisor’s next course of action (e.g., employee recognition, demonstration of correct behavior, additional training).

The study was conducted at four diverse food processing facilities with the support of the plant management teams:

- ▶ **Soup/sauce plant (California, USA)**— manufacturing company supplying a variety of soups and sauces through U.S. distribution to foodservice, retail, and other manufacturers.
- ▶ **Meat processing facility (Wisconsin, USA)**— plant operated by a global supplier of a wide array of protein items for foodservice and retail customers.
- ▶ **Cheese/dairy operation (Missouri, USA)**— small dairy utilizing its own bottling plant to supply a variety of dairy products to companies in multiple states.
- ▶ **Meat production plant (Illinois, USA)**— one of many worldwide manufacturing plants operated by a global supplier of protein and baked goods items.

Corrective Observation Evaluation Scale

LEVEL OF PERFORMANCE	SCALE	INTERVENTION
Perfect <i>No Improvement Needed</i>	95-100	Give recognition.
Very Strong <i>Small Improvement Needed</i>	90-94	Give recognition & deeper knowing questions?
Strong <i>Some Improvement Needed</i>	85-89	Coach & correct behavior & deep knowing questions?
Adequate <i>Improvement Needed</i>	80-84	Coach & demonstrate to correct behavior & questions for understanding?
Average <i>Considerable Improvement Needed</i>	75-79	All of the above repeated numerous times! Questions for understanding?
Fair <i>Substantial Improvement Needed</i>	70-74	Retraining on the specific behavior.
Weak <i>Tremendous Improvement Needed</i>	50-69	Retraining on the whole process.
Disaster <i>Start Over</i>	0-49	Intensive retraining on all processes of the operation.

Exhibit 4

Soup & Sauce Production Facility (California, USA)

At this facility, the team chose to study the impact of training and corrective observation process on employee compliance with process controls of the kettle operation. The study measured the full kettle operation from ingredient staging through final cleaning and equipment sanitation. Nine discrete kettle operation steps were identified (Exhibit 5) and the team selected Step 4.0: Build the Kettle as the most critical from an in-process hygiene perspective.

A process map of the Kettle Build process and desired worker behavior was developed along with construction of a detailed corrective observation checklist (Exhibit 6).

Results

The facility's pre-training baseline of employee behavior compliance was 74 percent—the highest baseline of the four plants studied. After providing training, employee performance increased to 88 percent compliance. Following three corrective observations, compliance rose to 97 percent (Exhibit 7). Additional corrective observations yielded sustained behavior performance.

Kettle Operation Process

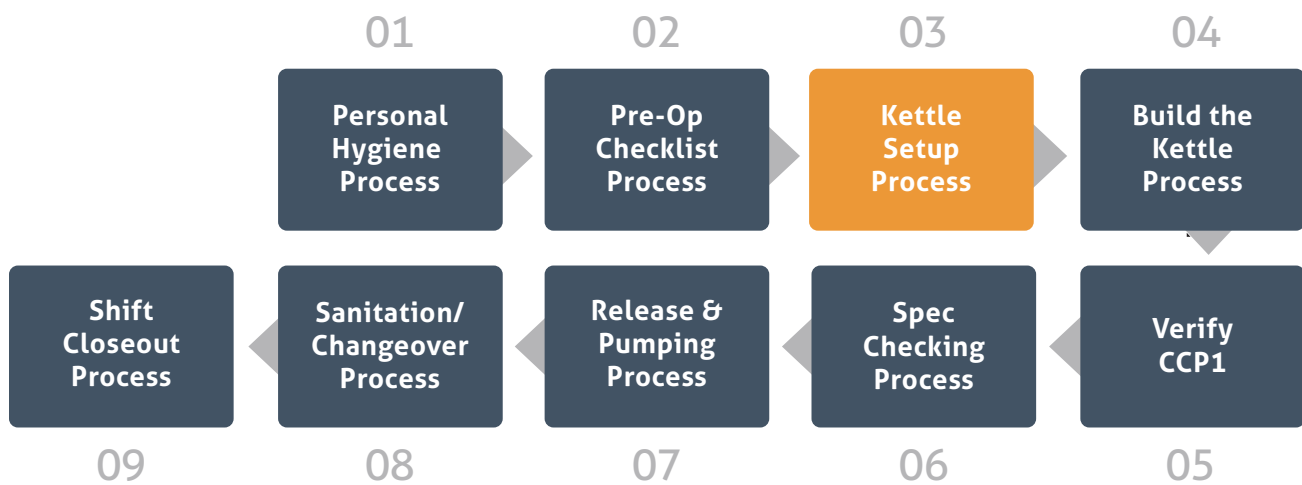


Exhibit 5

Kettle Corrective Observation Checklist

CODE	DEFICIENCIES	DEFICIENCY DEDUCTION	SCORE
4.1 Confirm work order			
4.1.1.1	Work order not confirmed at all	-20	
4.1.1.2	Work order and recipe don't match	-10	
4.1.1.3	Starting production with the wrong work order	-30	
4.2 Compare recipe with ingredients			
4.2.1.1	Not comparing the recipes with the ingredients on the rack	-20	
4.2.1.2	Not using labels in the confirmation process	-10	
4.2.1.3	Not correcting any errors	-20	
4.2.1.4	Starting production before correcting errors	-30	
4.3 Confirm quality			
4.3.1.1	Not confirming the quality of all the ingredients	-20	
4.4 Confirm material			

Exhibit 6

Employee Behavior Compliance — Soup & Sauce Facility

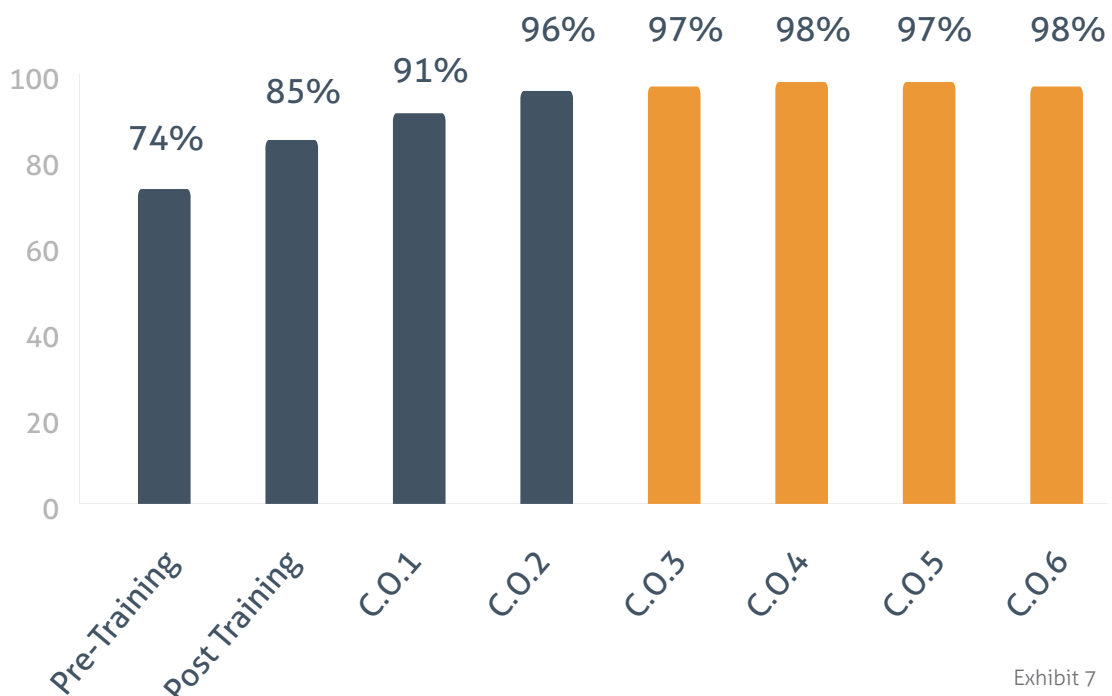


Exhibit 7

Meat Processing Facility (Wisconsin, USA)

The team determined that in-process hygiene would be the focus area for this processor of meat nuggets because it is critical to food safety compliance. The team chose the hopper filling process which includes opening boxes, dumping, checking weight, wrapping, and packaging chicken nuggets along a production line (Exhibit 8).

Once the process was mapped, the team also developed a detailed corrective observation checklist of desired behaviors along each step of the hopper line (Exhibit 9).

Results

The pre-training baseline of employee behavior compliance was only 65 percent (Exhibit 10). Based on the process review the project team concluded that the hopper process was not optimally designed and proceeded to make significant changes. The targeted training that was provided included these new operational changes. After training, positive employee behaviors increased to 74 percent compliance and rose to 90 percent following three corrective observations. Despite the 25 point improvement (65 percent to 90 percent), the team decided to continue the corrective observations. After five corrective observations, compliance further increased to 93 percent.

Hopper Filling Process Steps

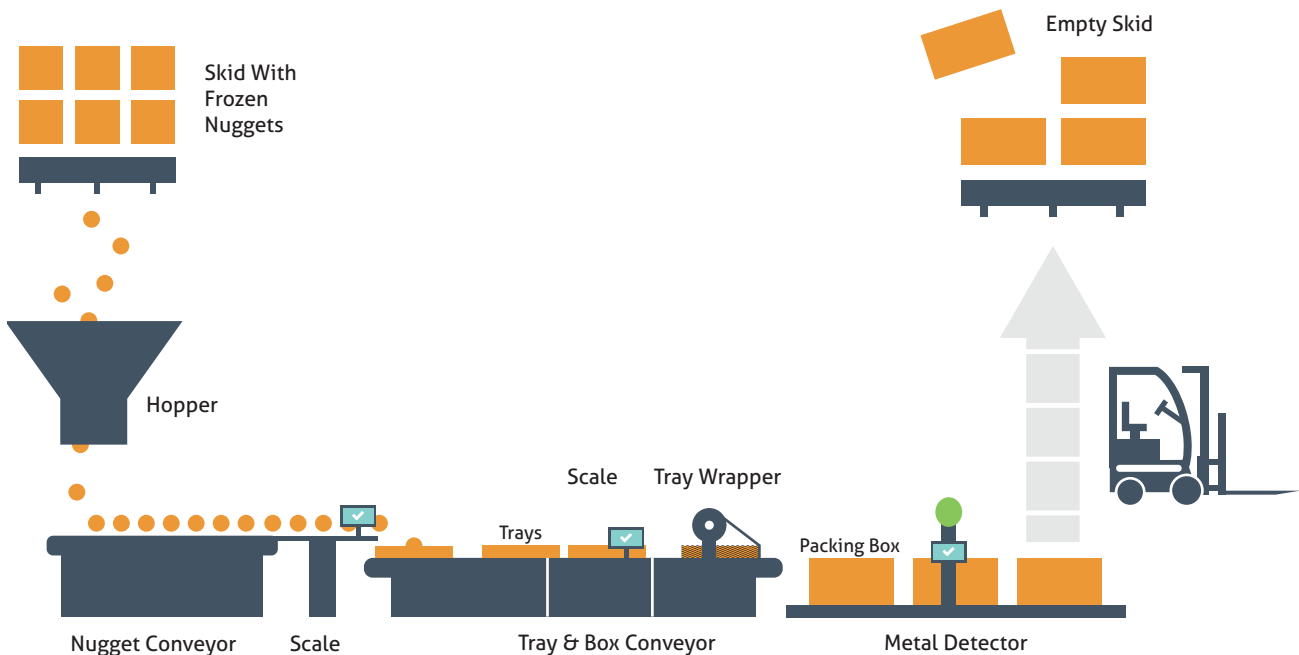


Exhibit 8

Hopper Filling Corrective Observation Checklist

CODE	DEFICIENCIES	DEFICIENCY DEDUCTION	SCORE
3.1 Make sure hopper is free and clear of any debris			
3.1.1.1	Not checking the hopper at all	-20	
3.1.1.2	Not finding all debris in hopper	-10	
3.1.1.3	Not removing all debris from hopper	-10	
3.2 Right product available and documented			
3.2.1.1	Proceeding to process the wrong product	-20	
3.2.1.2	Not getting the right product when the wrong product is on the scissors table	-20	
3.2.2.1	Failure to fill out the form completely and accurately	-10	
3.2.3.1	Failure to turn in the form at the right time and get in the right place	-10	

Exhibit 9

Employee Behavior Compliance — Meat Processing Plant

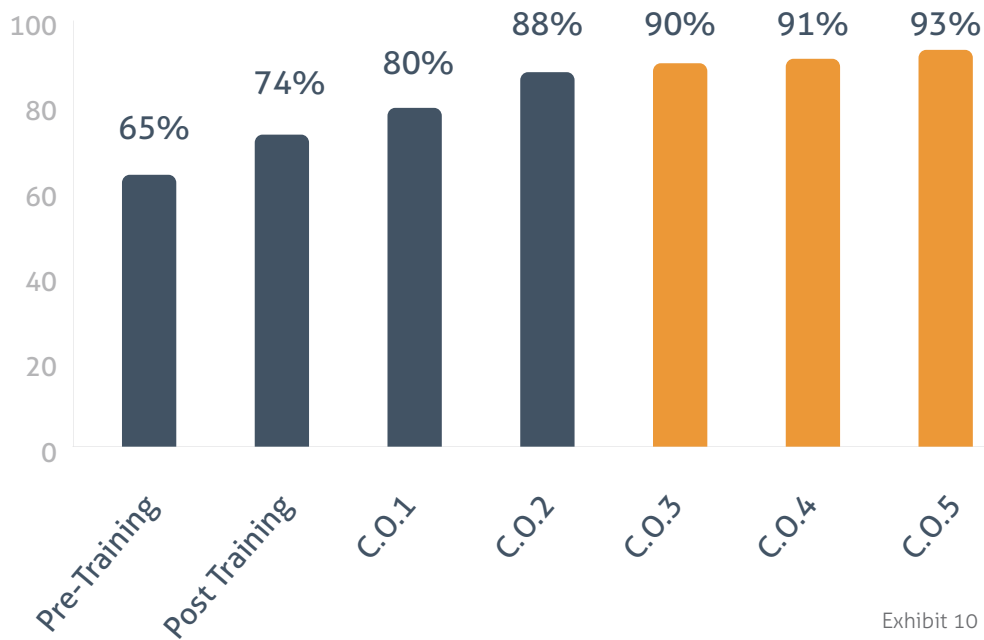


Exhibit 10

Cheese/Dairy Operation (Missouri, USA)

The facility processes specialty cheese which is distributed throughout the Midwest. The facility is not SQF certified, but the company desired to achieve certification given the growing demands from current customers and future plans to distribute product nationally. Management was concerned that with a relatively high turnover at the facility, significant improvement might be required to meet SQF standards. Employees had experienced little formal training at the beginning of the study. Much of the employee training had been on the job with some basic Good Manufacturing Practice (GMP) training provided during orientation.

The study team chose to focus on all aspects of GMPs and personal hygiene including:

- ▶ Hand washing procedures
- ▶ Entry/exit procedures
- ▶ Sickness/cuts/abrasion procedures
- ▶ Clothing and jewelry procedures
- ▶ Personal hygiene procedures
- ▶ Visitor and staff hygiene procedures
- ▶ Once the process steps were identified, corrective observation checklists were developed (Exhibit 11).

Results

The pre-training employee behavior compliance rate was 71 percent, a figure determined based on the absence of formal GMP or personal hygiene training provided to the employees prior to the study. After the targeted training was developed and delivered, the GMPs and personal hygiene compliance rates immediately increased to 82 percent. After three corrective observations, the compliance rate improved to 92 percent. The facility conducted a fourth corrective observation and compliance improved to 98 percent (Exhibit 12).

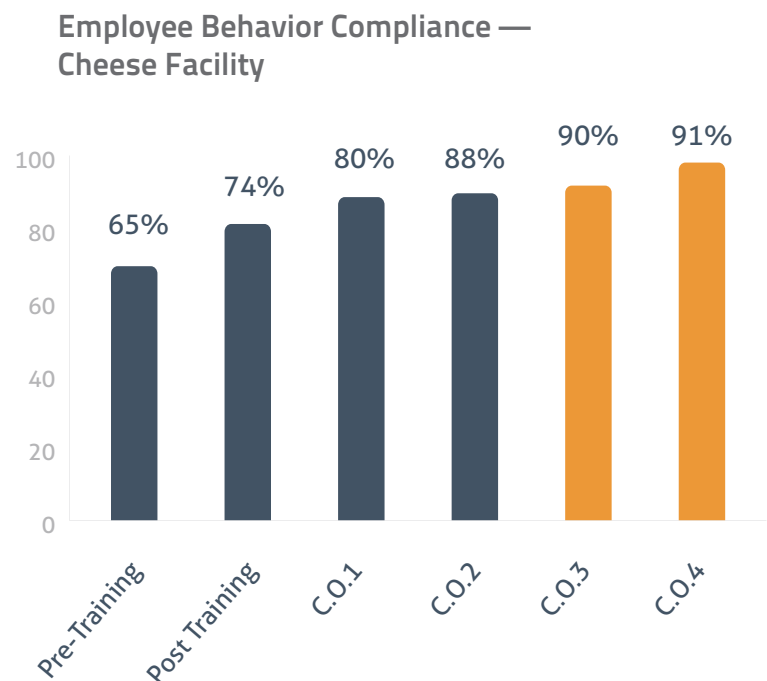


Exhibit 11

Sample Hand Washing Corrective Observation Checklist

CODE	DEFICIENCIES	DEFICIENCY DEDUCTION	SCORE
1.1 Wet hands and forearms thoroughly and apply soap			
1.1.1	Not wetting thoroughly enough	-10	
1.1.2	Not wetting forearms at all	-10	
1.1.3	Not using soap at all	-20	
1.1.4	Not enough soap	-10	
1.1.5	Not putting soap on forearms	-10	
Total Deficiency Deductions			
Total Step Score (100 minus total deductions)			
1.2 Scrub hands and forearms for at least 15 second			
1.2.1	Not scrubbing at all	-20	
1.2.2	Not scrubbing long enough	-10	
1.2.3	Not scrubbing forearms	-20	
1.2.4	Not scrubbing back of arms	-10	
Total Deficiency Deductions			
Total Step Score (100 minus total deductions)			
1.3 Rinse hands and forearms thoroughly			
1.3.1	Not rinsing hands at all	-20	
1.3.2	Not rinsing thoroughly-soap left	-10	

Exhibit 12

Meat Processing Plant (Illinois, USA)

The study team at this meat processing facility wanted to define the impact of employee performance on workplace safety for the employees. Specifically, the team wanted to learn if the meat tub/grinding process (filling, tub moving, machine hookup, dumping, and return) could be improved in order to minimize worker injuries.

Once the process was charted and desired worker behaviors identified, the team developed a corrective observation checklist (Exhibit 14).

Results

The pre-training employee behavior compliance rate was 64 percent. Once training was provided, positive employee behaviors jumped by 21 points to 85 percent compliance. After three corrective observations, compliance reached 100 percent, which impressed the management team (Exhibit 13).

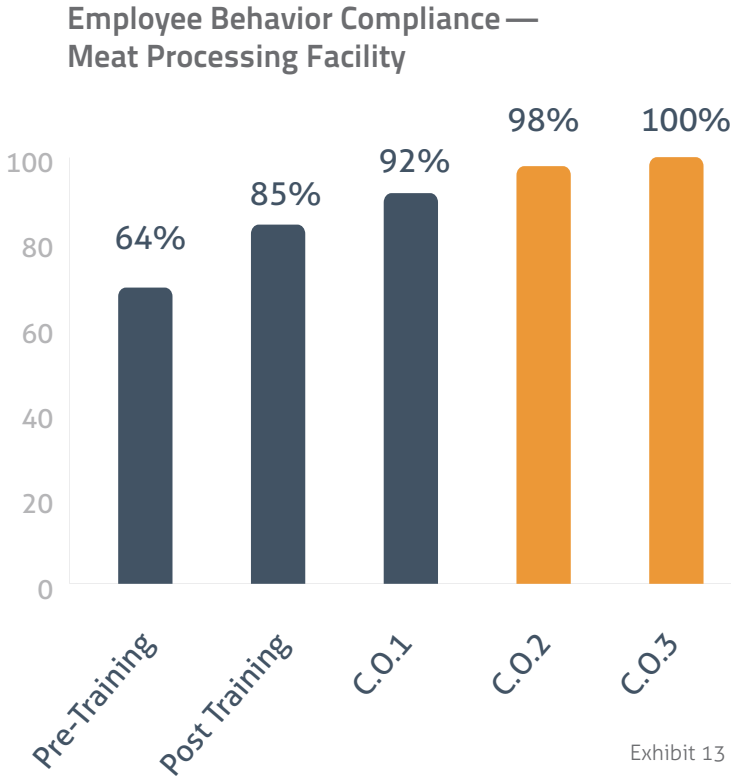


Exhibit 13

Grinder/Tub Corrective Observation Checklist

CODE	DEFICIENCIES	DEFICIENCY DEDUCTION	SCORE
3.1 Line up Tub			
3.1.1.1	Not using left hand to push tub under grinder	-10	
3.1.1.2	Not leaning into tub with left hand	-20	
3.1.2.1	Not leaving space between the tub	-20	
3.1.3.1	Tub not aligned with center of grinder	-10	
3.1.3.2	Making tub adjustments with one hand	-10	
3.1.4.1	Tub not pushed back flush with grinder	-10	
3.2 Start or stop the grinder			
3.2.1.1	Not using pointed index finger to start or top the grinder	-10	
3.2.2.1	Not using dominant hand to start or stop the grinder	-10	
3.2.3.1	Starting the grinder before the tub is lined up under the grinder	-20	
3.2.4.1	Not stopping the grinder in a timely manner when an issue is perceived	-25	
3.3 Let meat fall in the tub, push down			
3.3.1.1	Pushing meat into grinder	-15	
3.3.1.2	Guiding meat into the tub with hands underneath the meat	-20	

Exhibit 14

Study Conclusion & Implications

The overall results of the study (Exhibit 15) indicate that employee compliance with standards and overall process results can be improved through a system of training, coaching, and corrective observation. When the process was limited solely to targeted training, compliance climbed from 68 percent to 82 percent—a 14-point increase. After three corrective observations, the average increase in compliance rose significantly to 94 percent.

The consistent improvement across all four facilities is a clear indication that training coupled with detailed corrective observations by front-line supervisors can drive behavior change, improve safety and increase productivity. It should be noted that all of these findings of improved compliance are consistent despite the diversity of operations, employee demographics, food safety or workplace safety processes, and geographic location of plants.

The study also highlighted additional observations:

- ▶ Standards, operations, and processes can be reduced to a sequence of behaviors.
- ▶ Measurement of behaviors can be credible and attainable.
- ▶ Employees can quickly evolve from average performance to superior performance.
- ▶ Supervisors can become effective coaches and subject matter experts.
- ▶ Systematic assessment of employee behaviors identifies possible product and employee safety risks.
- ▶ Targeted training is effective in improving behavioral performance.
- ▶ Sustained employee performance can only be accomplished through continuous training, coaching, and corrective observations.
- ▶ Manual documentation and reporting would be meaningfully improved when administered through a technology platform.

The data indicates that companies can effectively assess their plant's processes and align employees with productivity and safety objectives through a process of targeted training, corrective observations, and corrective actions.

Change in Food Handler Performance

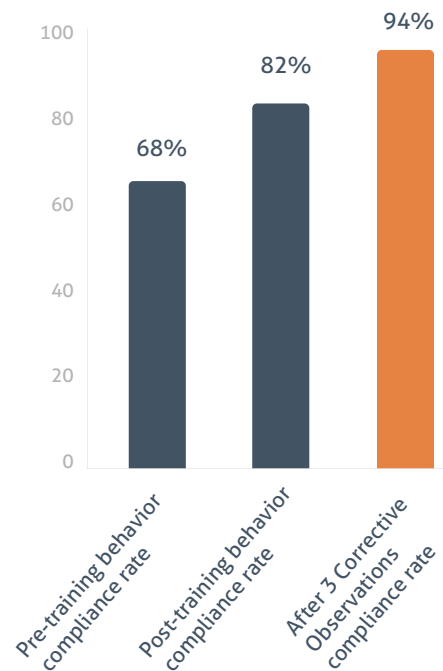


Exhibit 15



About Alchemy Systems, LP

Alchemy is a global leader of innovative technologies and services designed to align employee behavior with a company's quality and safety commitments. From farm to fork, we focus on building successful safety cultures for large, diverse workforces. Over the last decade, we have partnered with our customers to increase productivity, ensure regulatory compliance, foster safe working environments, and produce quality products. For more information, please go to alchemysystems.com.

Footnotes


1 "Recalls, Market Withdrawals and Safety Alerts Search." U.S. Food and Drug Administration. August 2013.

<http://www.fda.gov>

2 "CDC Estimates of Foodborne Illness in the United States." 2011. <http://www.cdc.gov/foodborneburden>

3 "Ensuring Food Safety and Nutrition Security to Protect Consumer Health: 50 Years of the Codex Alimentarius Commission." World Health Organization. July 2013. <http://www.who.int/bulletin/volumes/91/7/13-125518/en/>

4 "Project Outcomes Survey 2007-Submitted to the Texas Workforce Commission." Hands of the Community (dba "Food Training Institute"). 2007.

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